

ENDOCRINE

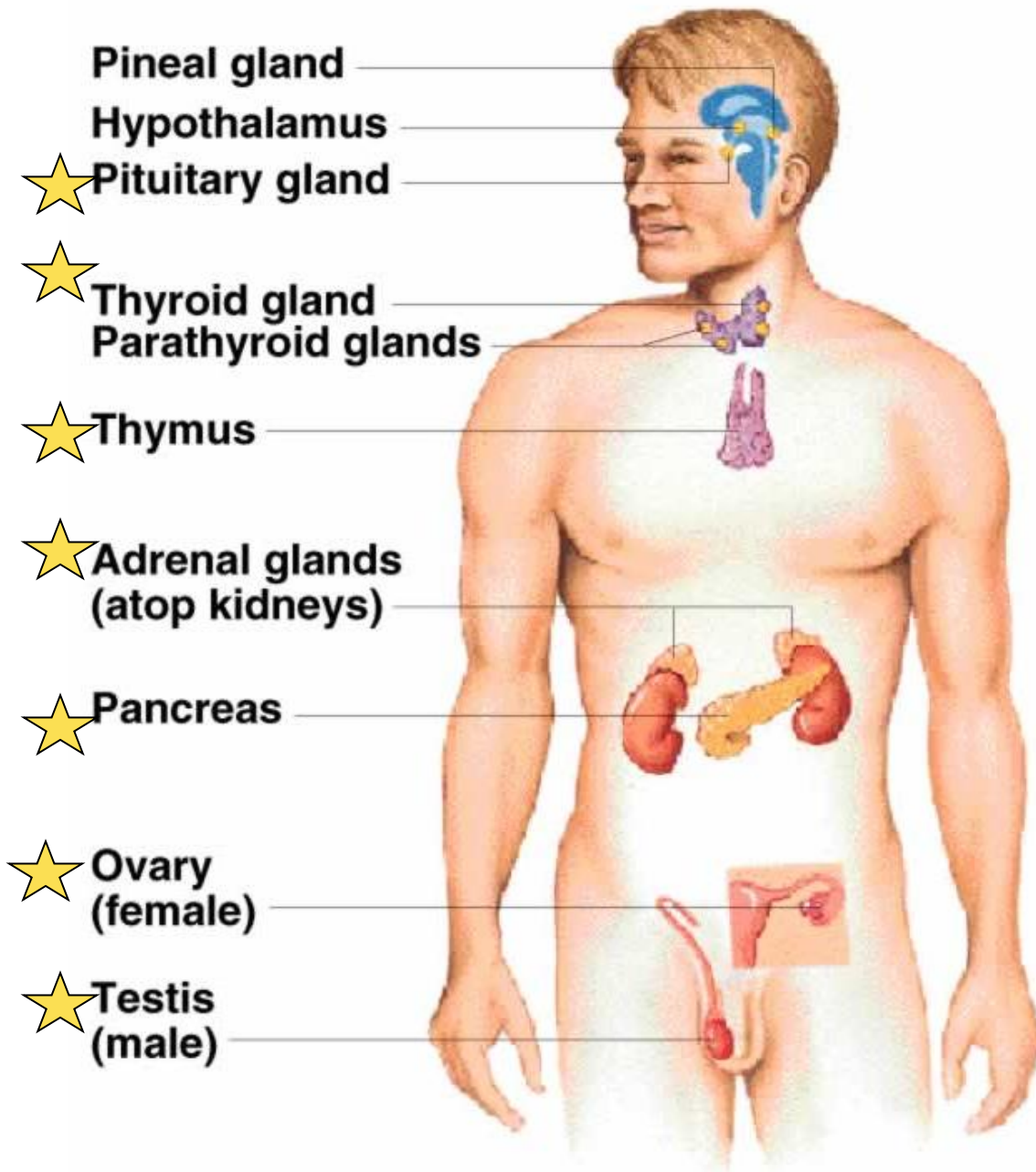
Biodeluna.wordpress.com/



Endocrine System Function

**control systems,
maintain homeostasis:**

- a) control chemical and water balance in body
- b) control growth and metabolism
- c) control embryonic development and preparation for nurturing a newborn
- d) influence sexual behavior, stimulate growth and maturation of the gonads
- e) feedback to the nervous system



Pineal gland

Hypothalamus

★ Pituitary gland

★ Thyroid gland

Parathyroid glands

★ Thymus

★ Adrenal glands
(atop kidneys)

★ Pancreas

★ Ovary
(female)

★ Testis
(male)

Endocrine System

How does it work?

Basic Overview of the Feedback System

- 1) *Nervous systems monitors environment*
- 2) If **aberrations** are detected - **nervous** system sends **message** to **endocrine glands**
- 3) **Endocrine glands** produce and secrete **hormones** into *blood*
- 4) Hormones hit **target** organ
- 5) Target organ produces *substance*
- 6) Substance is picked up by receptors and **brain stops sending message** to endocrine glands

HORMONES

- **Hormones** – *chemical substances secreted by cells into the extracellular fluids*

Carried in bloodstream to “target” cells/tissues

	Nervous system	Endocrine system
Speed of conduction		
Route of conduction		
Area affected		
Duration of response		

|

	Nervous system	Endocrine system
Speed of conduction	faster	slower
Route of conduction	nerves	blood system
Area affected	very localised	rather general
Duration of response	short-lived	longer lasting

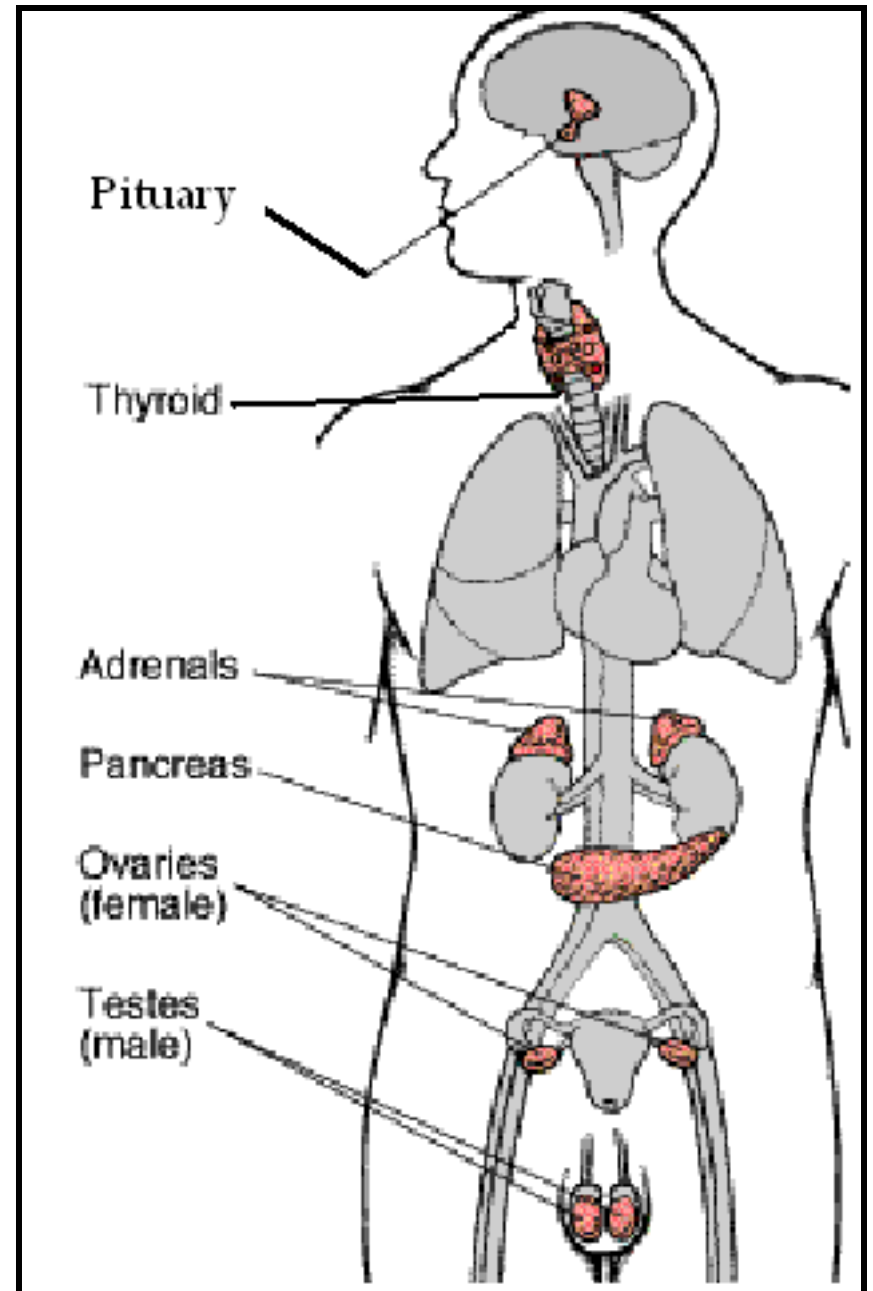
The Endocrine System

Consists of:

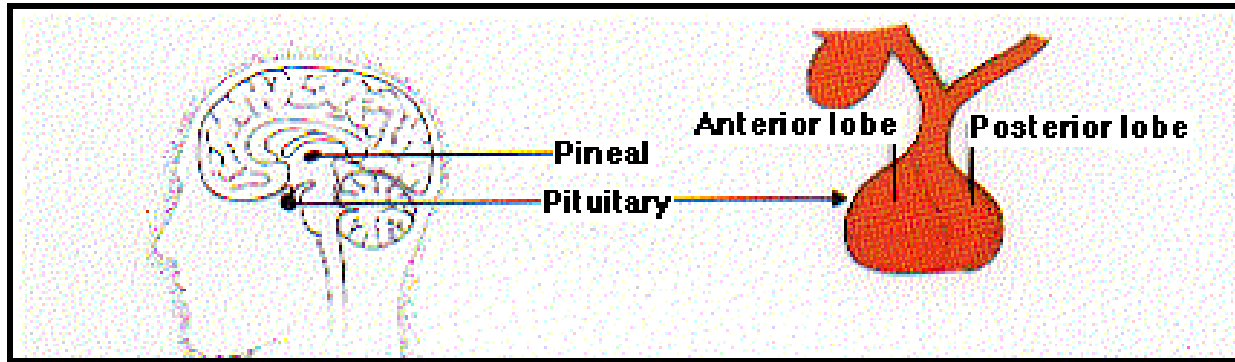
Endocrine glands

Release hormones into the bloodstream.

Hormones are chemicals released in one part of the body that travel through the bloodstream and affect the activities of cells in other parts of the body.

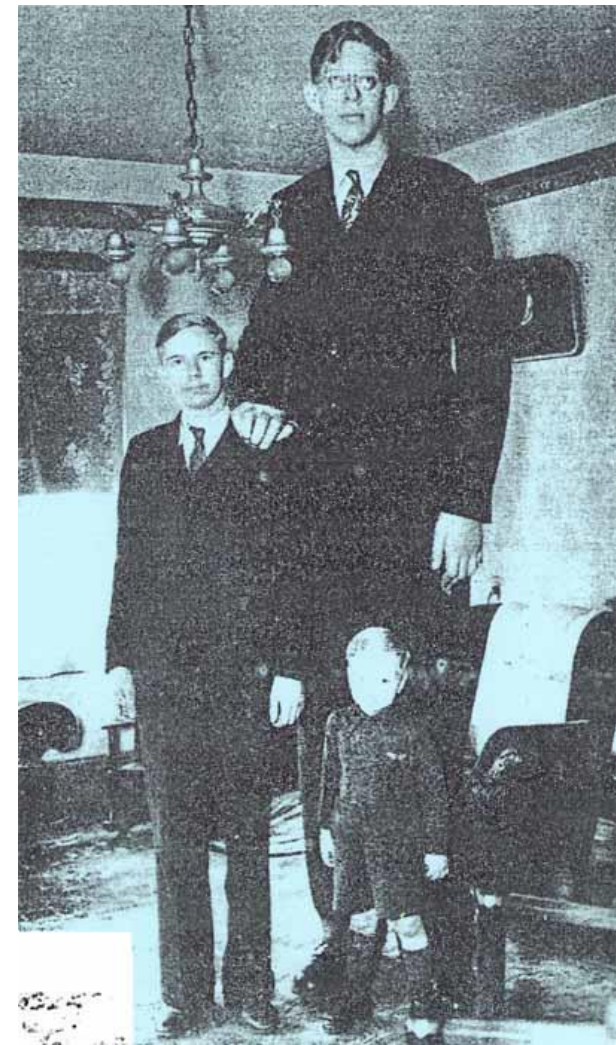


Pituitary Gland



Function: It secretes nine hormones that directly regulate many body functions and controls functions of other glands.

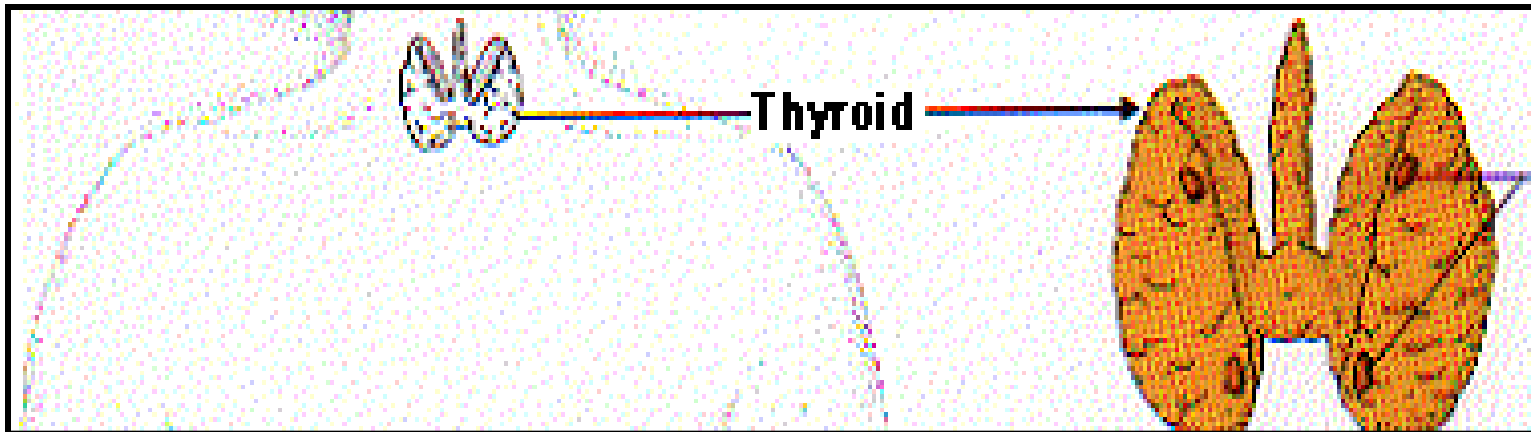
Disorders: Too much *growth hormones (GH)* in early childhood can result in a condition called *gigantism*. Too little GH can result in *Pituitary Dwarfism*.



Robert
Wadlow

Thyroid Gland

- **Function:** plays a major role in regulation the body's metabolism.
- **Disorders:** If the Thyroid Gland produces to much Thyroxin, it can cause a condition known as Hyperthyroidism. If to little thyroxin produces it is called Hypothyroidism.

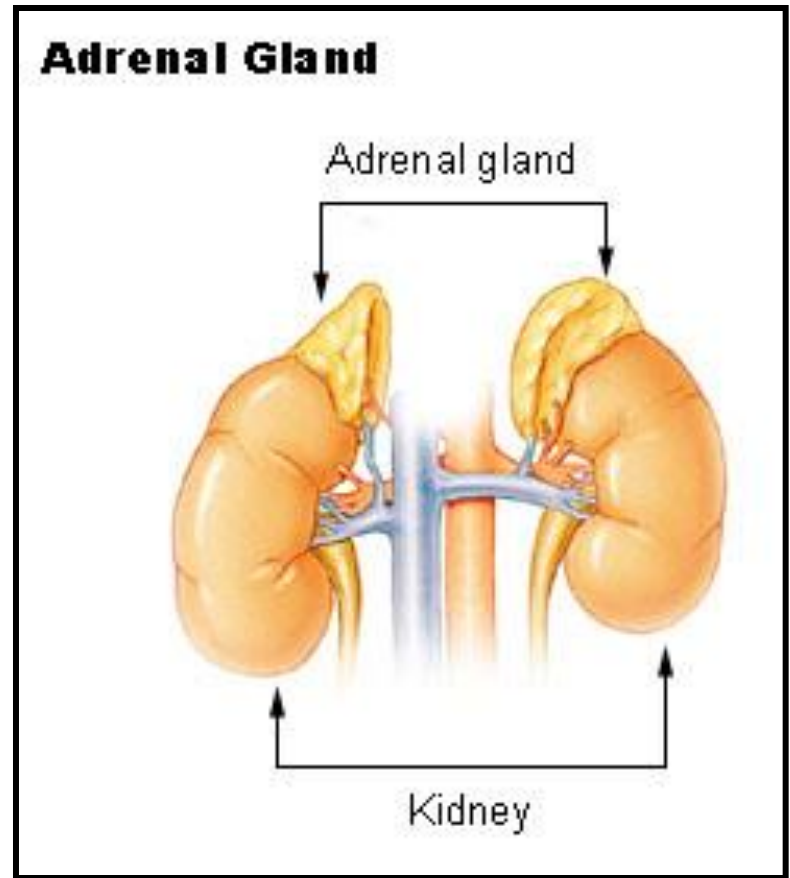


Pancreas

- **Function:** The Insulin and Glucagon in the Pancreas help to keep the level of glucose in the blood stable.
- **Disorders:** When the Pancreas fails to produce or properly use Insulin, it can cause a condition known as **Diabetes Mellitus**.

Adrenal Gland

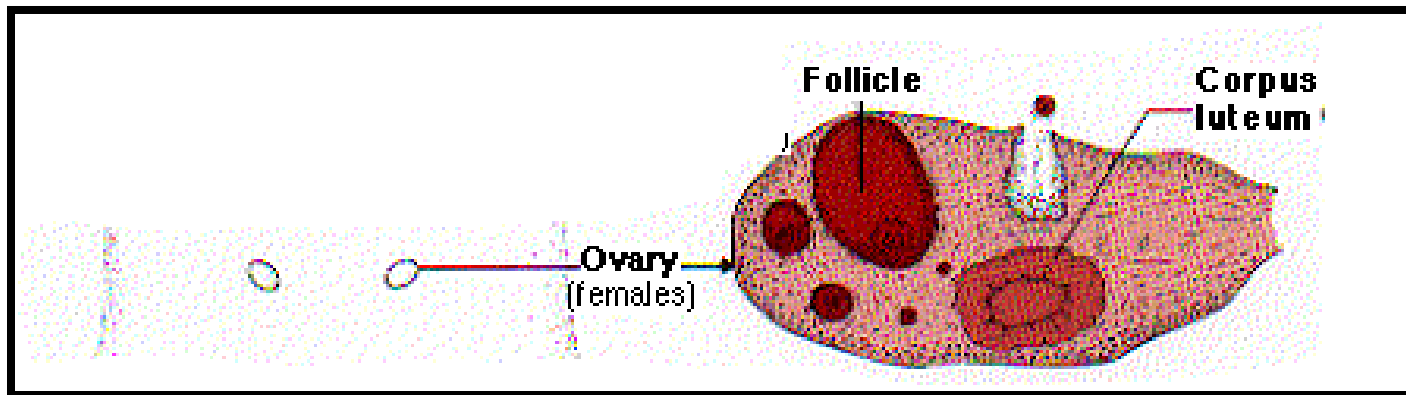
- **Functions:**
 - The adrenal glands release Adrenaline in the body that helps prepare for and deal with stress.
 - Also regulates kidney function.



Ovaries

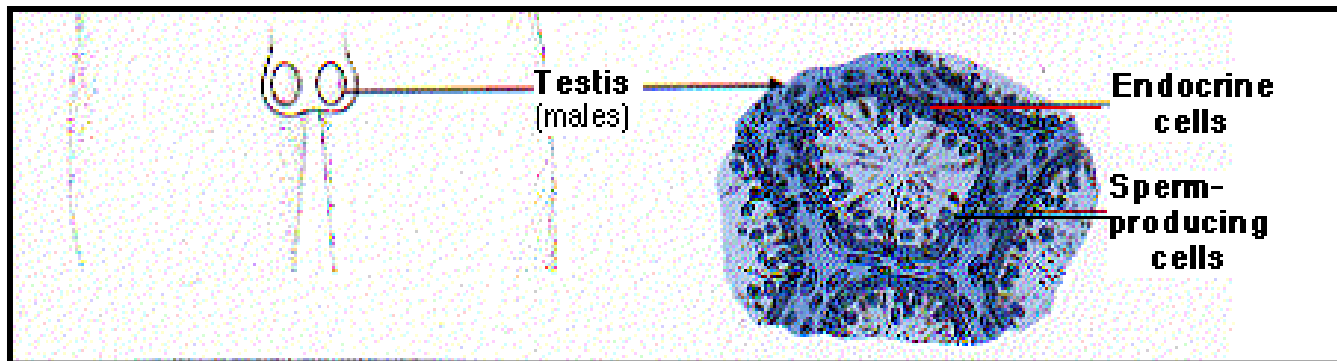
- **Functions:**

- Pair of reproductive organs found in women that produce eggs.
- Also secrete **estrogen** and **progesterone**, which control ovulation and menstruation.



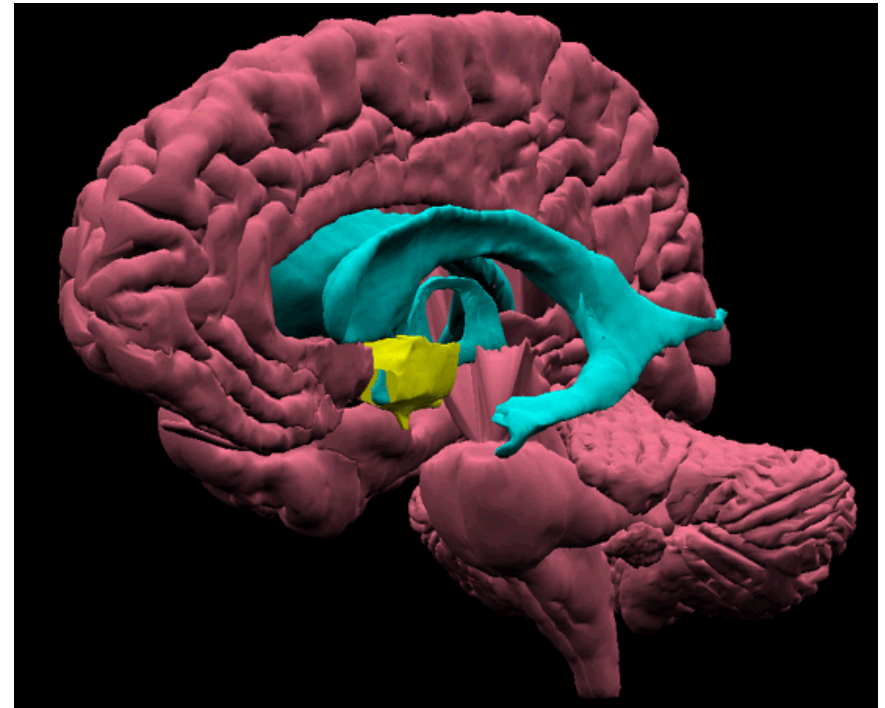
Testes

- **Functions:**
 - Pair of reproductive glands that produces sperm.
 - Also secrete **Testosterone** to give the body its masculine characteristics.



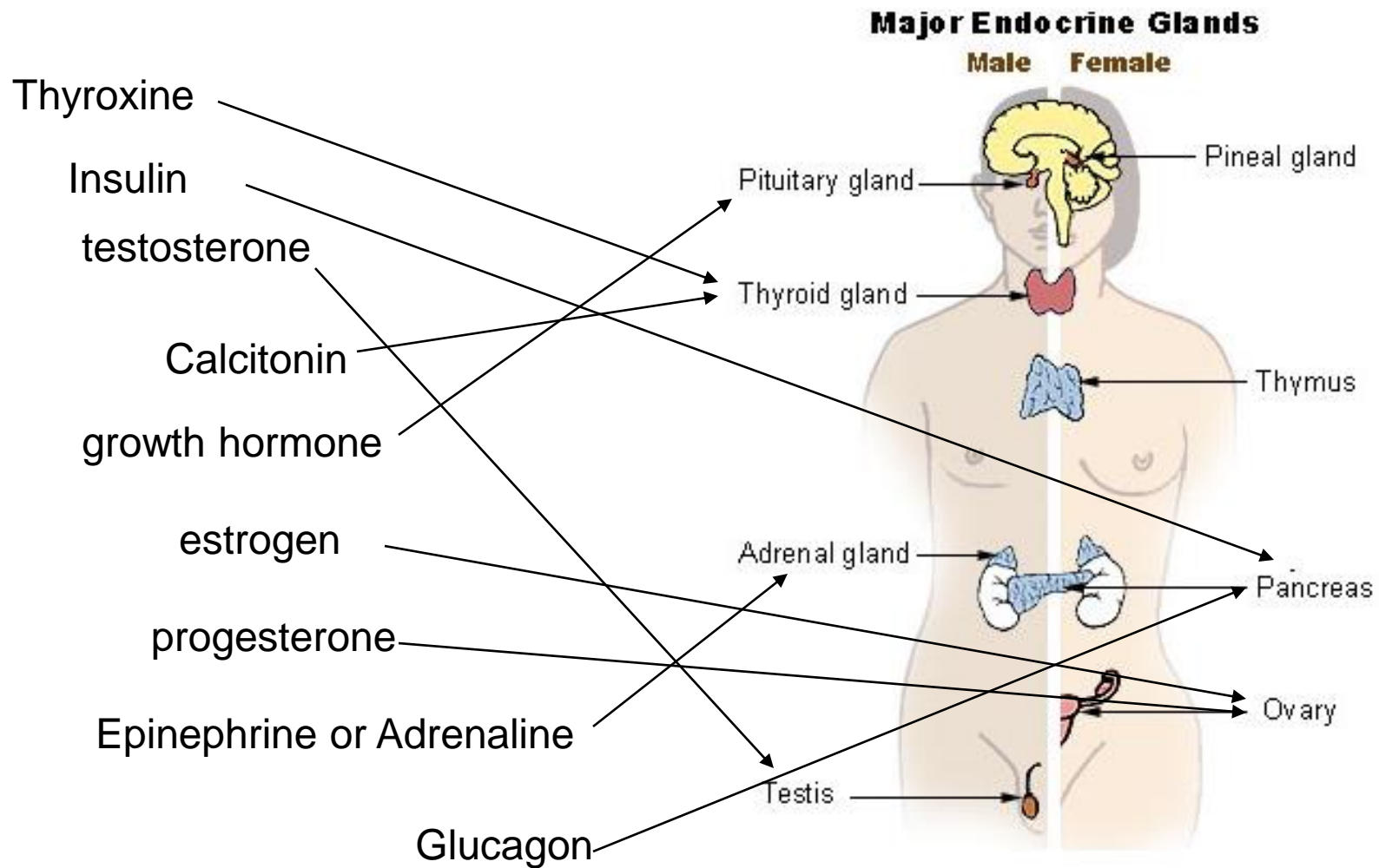
Interaction of Glands

The hypothalamus is located in the **brain** and controls the release of hormones from the **pituitary** gland. It is an important link between the endocrine and nervous systems.



<http://www.biocfarm.unibo.it/aunsnc/images/3D%20Objects/Hypothalamus.gif>

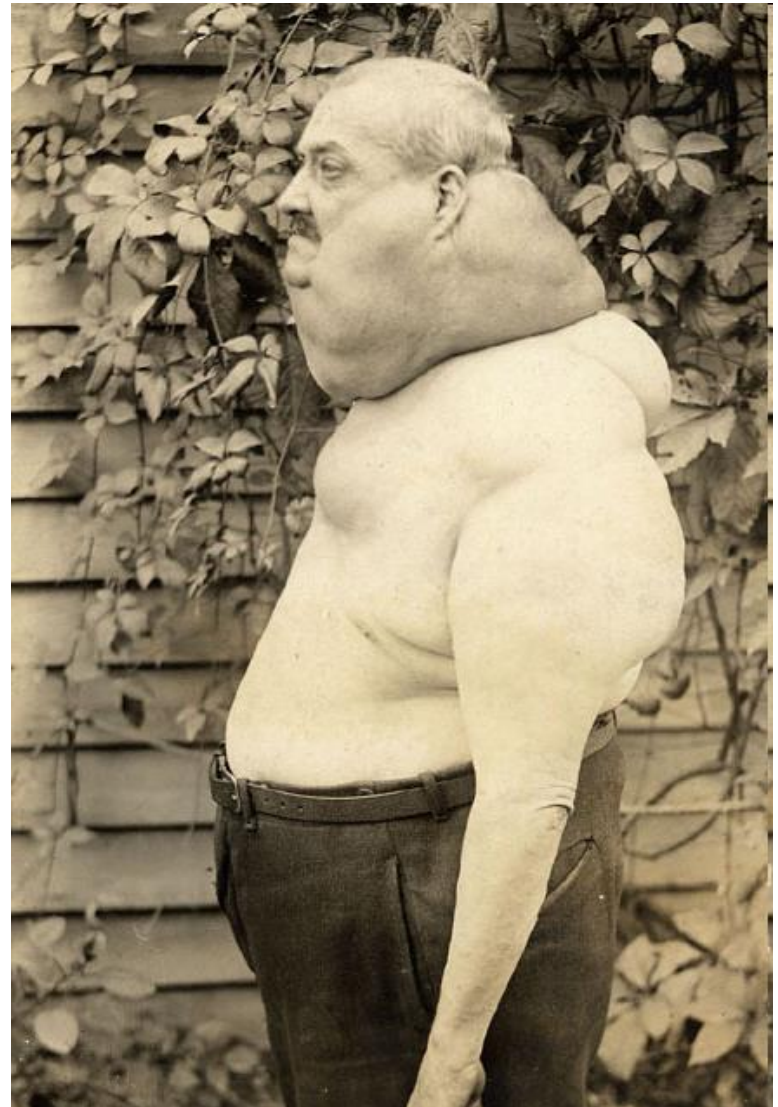
Where are these hormones generated?



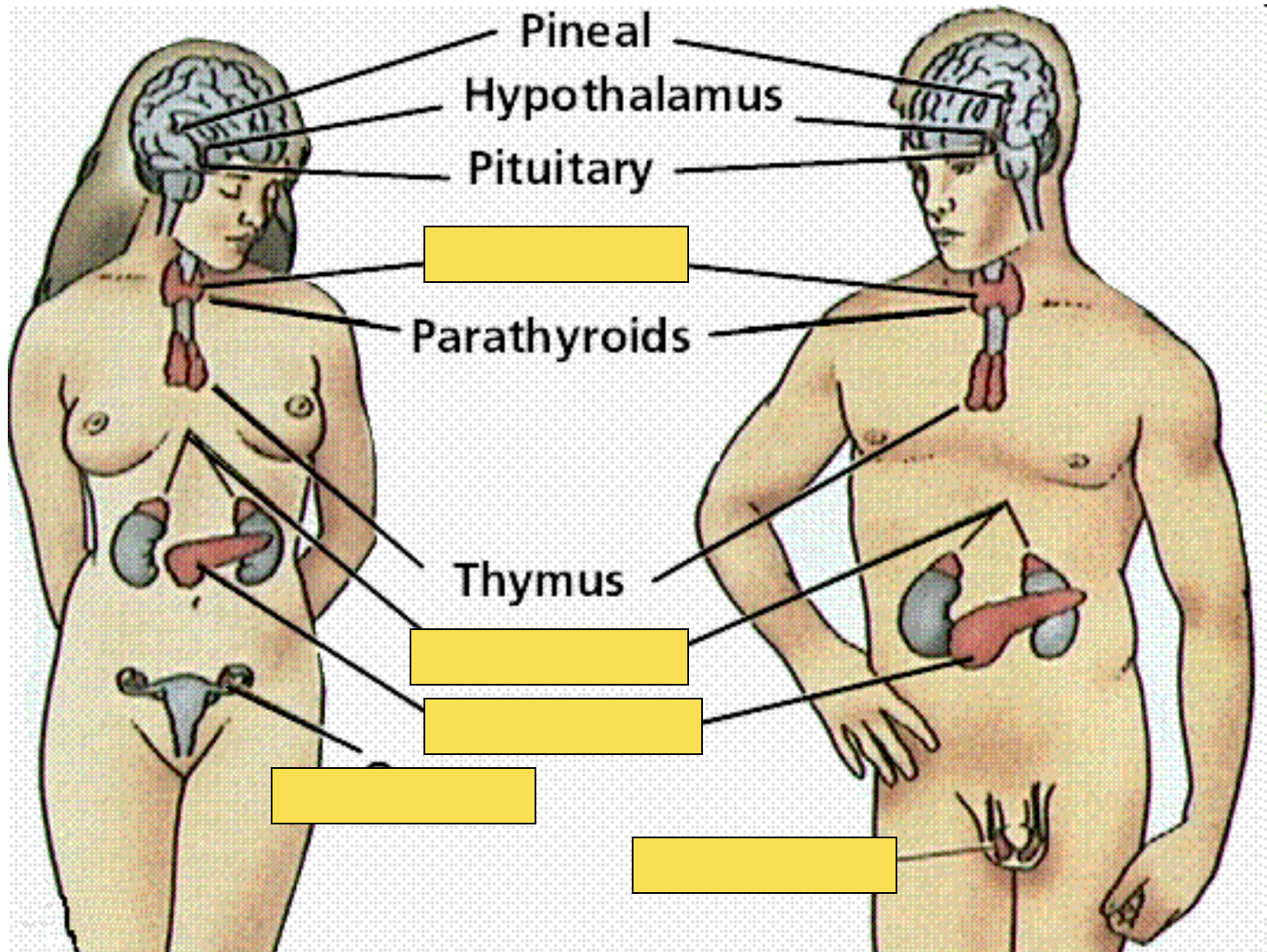
Diseases of the Thyroid

Goiter (overstimulation of thyroid)

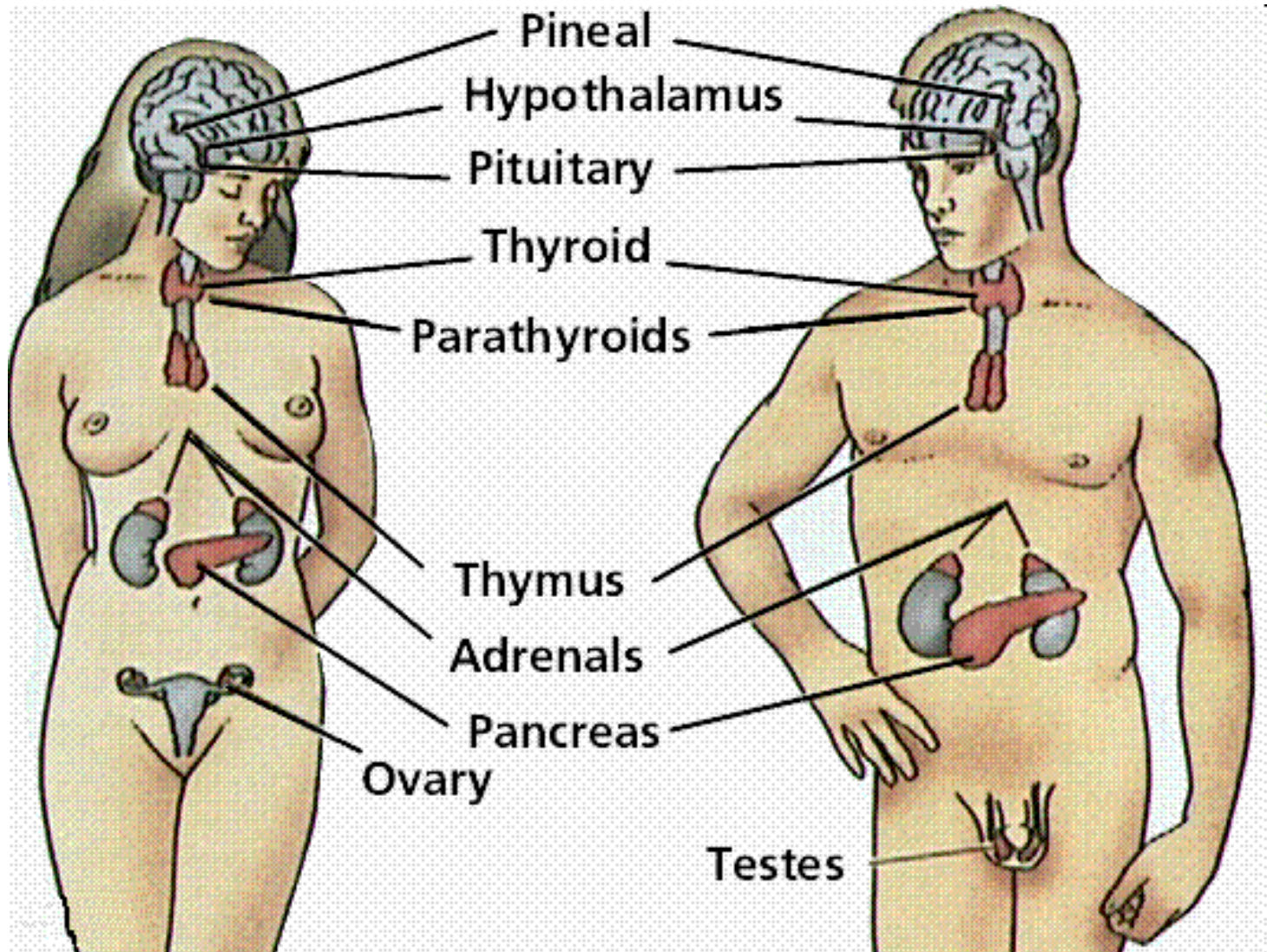
- *Thyroid-stimulating hormone (TSH) from the anterior pituitary stimulates the thyroid to secrete thyroxine; however, it also exerts a trophic (growth stimulating) effect on the thyroid. This effect is evident in people who develop an iodine-deficiency **goiter**, an abnormal growth of the thyroid gland. With the lack of adequate iodine in the diet it interferes with the negative feedback control of TSH secretion, resulting in the formation of an endemic goiter.*



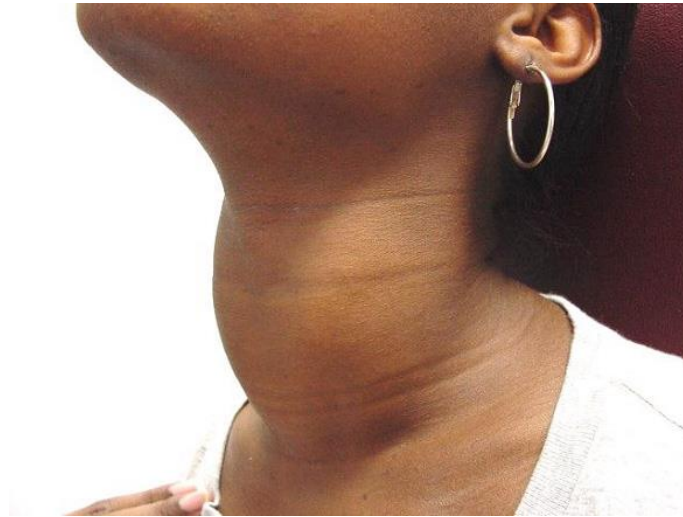
Fill in the gaps



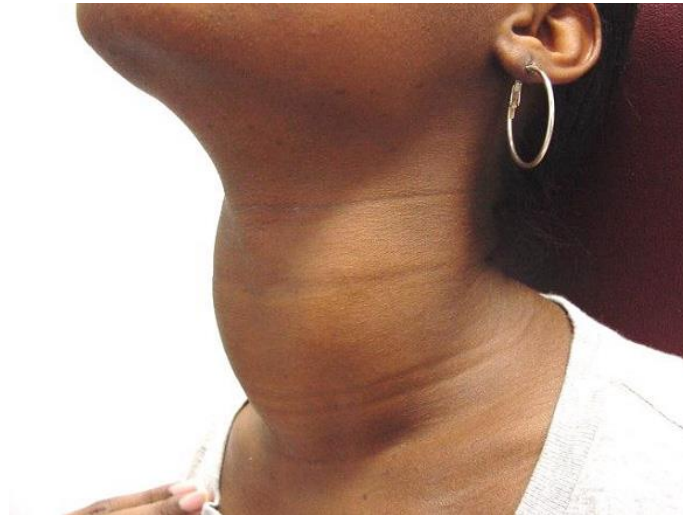
Fill in the gaps



Which disease do you think they suffer?



Which disease do you think they suffer?



WHY?

Which one of the following statements about adrenaline is correct?

- (a) It increases heart rate and increases release of glucose from the liver.
- (b) It increases heart rate and reduces release of glucose from the liver.
- (c) It reduces heart rate and increases release of glucose from the liver.
- (d) It reduces heart rate and reduces release of glucose from the liver.

Which one of the following statements about adrenaline is correct?



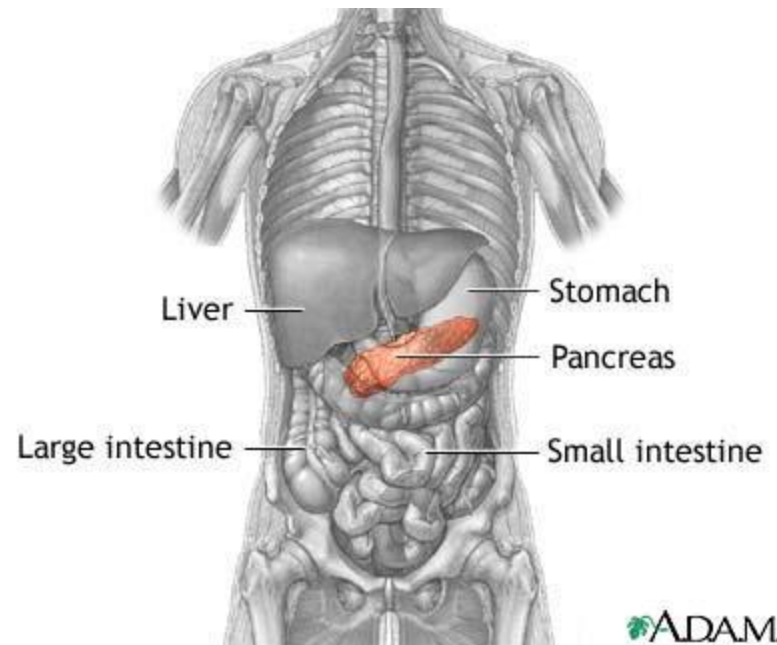
It increases heart rate and increases release of glucose from the liver.

(b) It increases heart rate and reduces release of glucose from the liver.

(c) It reduces heart rate and increases release of glucose from the liver.

(d) It reduces heart rate and reduces release of glucose from the liver.

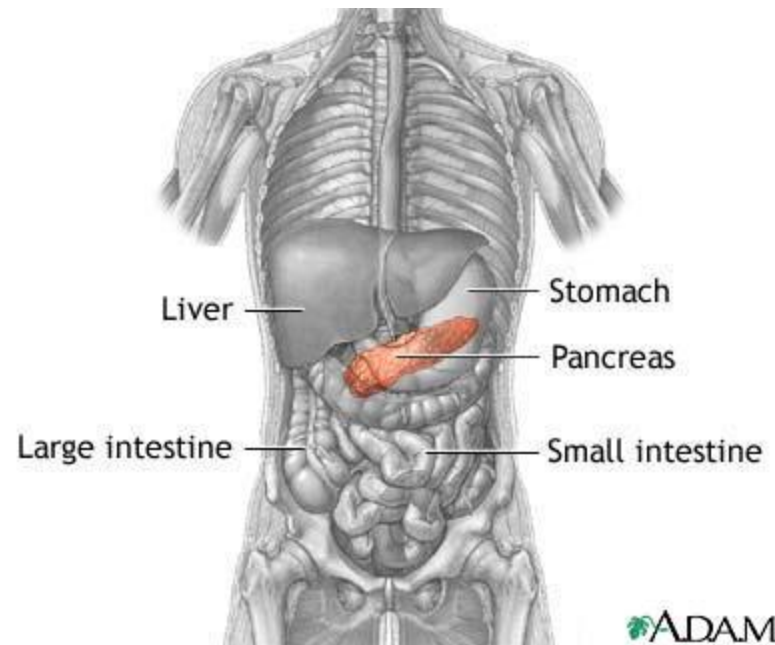
Name the two hormones produced by the pancreas



Name the two hormones produced by the pancreas

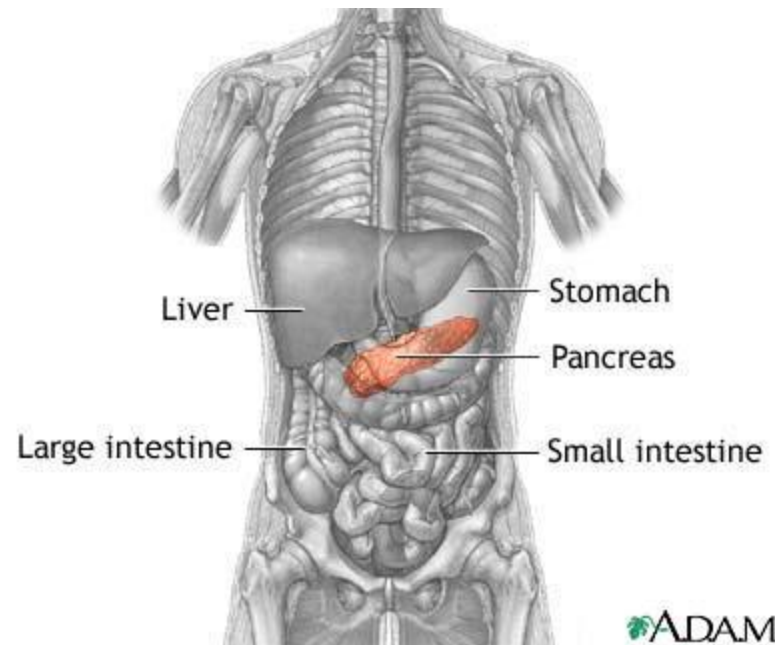
The pancreas produces the **hormones**

glucagon
and insulin.



Name the two hormones produced by the pancreas (glucagon *and* insulin) and say

- (a) in what circumstances,
- (b) in what way, they adjust the glucose concentration in the blood.



Name the two hormones produced by the pancreas (**glucagon** *and* **insulin**) and say

(a) in what circumstances,

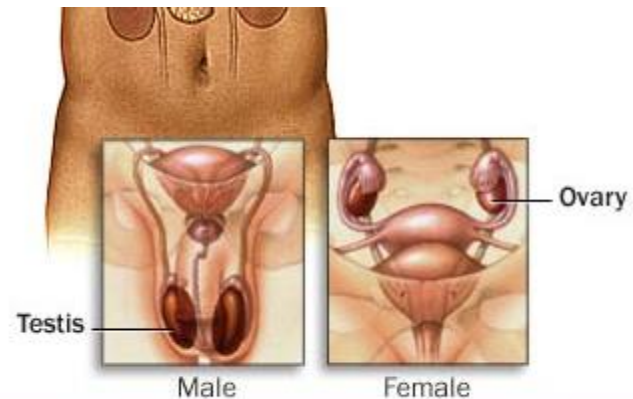
(b) in what way, they adjust the glucose concentration in the blood.

- **Glucagon** is produced in response to a fall in the concentration of glucose in the blood; it stimulates the liver to release glucose.
- **Insulin** is produced in response to a rise in the concentration of glucose in the blood; it stimulates the liver to convert glucose to glycogen.

Name the hormones produced by

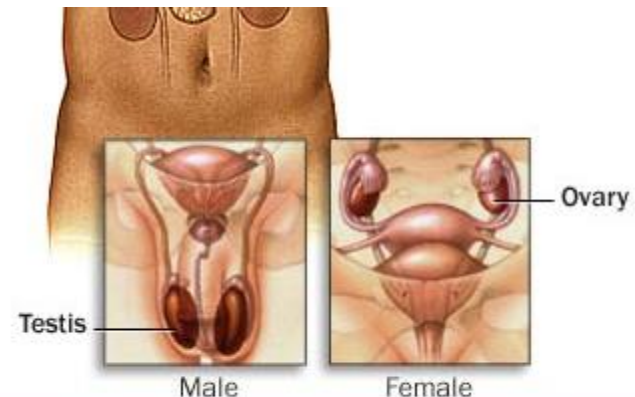
(a) the testes-

(b) the ovaries-

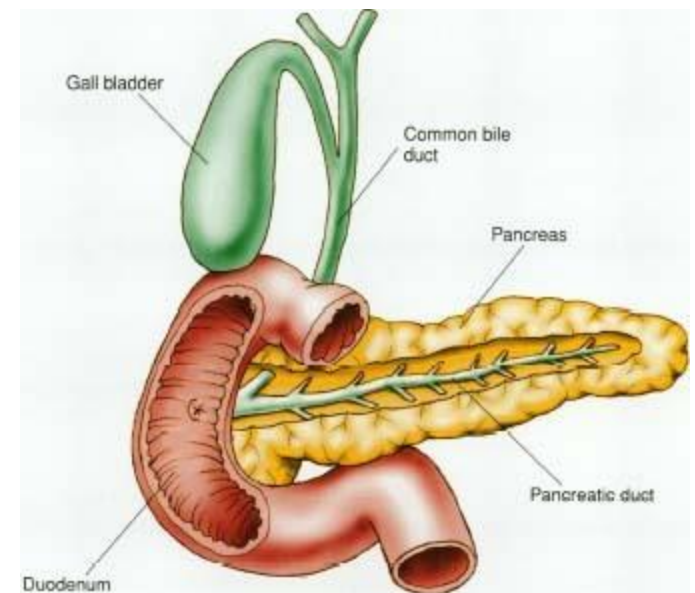


Name the hormones produced by

- The *testes* produce *testosterone*.
- The *ovaries* produce *oestrogen* and *progesterone*.



- (a) Name the condition and
- (b) describe the effects of the failure of the pancreas to produce sufficient-insulin.
- (c) How is this condition treated? .



(a) Name the condition and

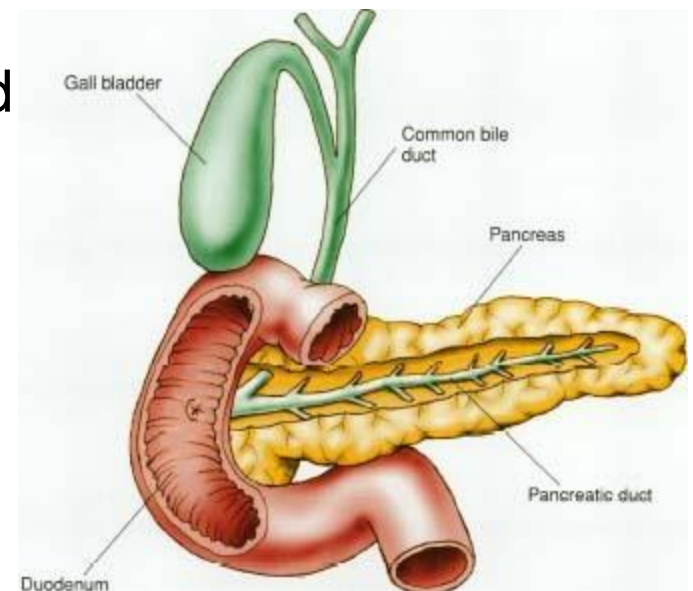
(b) describe the effects of the failure of the pancreas to produce sufficient-insulin.

(c) How is this condition treated?

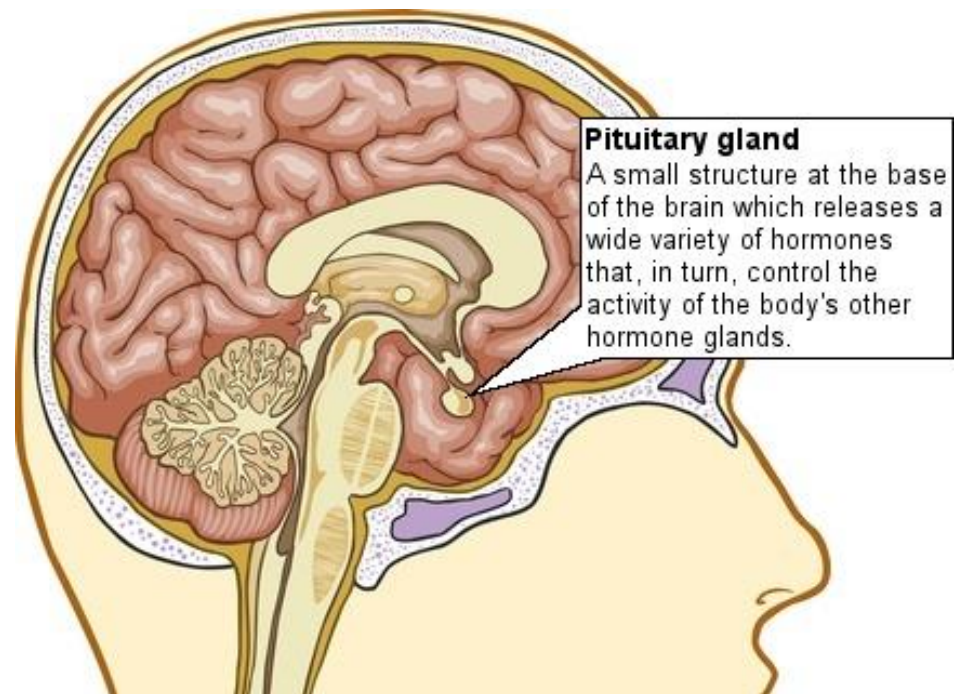
(a) Diabetes (insulin-dependent diabetes) is the condition which results from insufficient insulin.

(b) The diabetic is unable to control effectively the glucose concentration of the blood. The glucose concentration therefore fluctuates from dangerously high to dangerously low.

(c) Insulin-dependent diabetes is treated by regular injections of insulin, plus some dietary control.

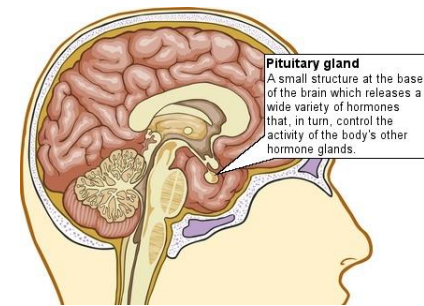


The pituitary gland produces several hormones, including ADH, FSH, LH and TSH. Give the full name of each of these hormones and say briefly what each one does.



The pituitary gland produces several hormones, including ADH, FSH, LH and TSH. Give the full name of each of these hormones and say briefly what each one does.

- **ADH-anti-diuretic hormone**, causes the kidneys to reabsorb more water from the renal tubules, so reducing the production of urine.
- **FSH-follicle-stimulating hormone**, acts on the ovaries and promotes the maturation of the follicles.
- **LH-luteinising hormone**, acts on the follicles to cause ovulation.
- **TSH-thyroid-stimulating hormone**, stimulates the thyroid gland to produce thyroxine.



- <http://www.anselm.edu/homepage/jpitocch/genbio/endocrinenot.html>